

REMARKS

Claims 1-10 are pending in this application. By this Amendment, claims 1, 4 and 10 are amended.

The attached Appendix includes marked-up copies of each rewritten claim (37 C.F.R. §1.121(c)(1)(ii)).

Claim 4 was objected to due to an informality. By this Amendment claim 4 has been amended as suggested by the Examiner. It is respectfully requested that the rejection be withdrawn.

The Office Action rejects claims 4-9 under 35 U.S.C. §102(b) as being anticipated by Kyushima et al. (U.S. Patent No. 5,504,386), claims 1-3 under 35 U.S.C. §103(a) as being unpatentable over Kyushima in view of Frederick et al. (U.S. Patent No. 5,796,109) and claim 10 under 35 U.S.C. §103(a) over Wang et al. (U.S. Patent No. 4,221,967) in view of Kyushima. Applicants respectfully traverse these rejections

Applicants assert that none of the applied references disclose or suggest a photomultiplier tube wherein an outer surface of the metal side tube is flush with an edge surface of the stem plate, as recited in claim 4 and as similarly recited in claims 1 and 10.


Applicants first note that Kyushima corresponds to Japanese Unexamined Patent Application Publication No. HEI-5-290793, as disclosed on page 3 of Applicants' specification, and thus suffers deficiencies that Applicants' claims 1, 4 and 10 overcome. Kyushima instead teaches a transparent face blade with a photocathode deposited on its under surface, a generally-cylindrical sidewall made entirely of metal and an outwardly-protruding, flange-shaped, annular sealing area (col. 3, lines 57-61, Fig. 2b). Therefore, Applicants assert that the flush feature of Applicants' claims 1, 4 and 10 is not in Kyushima's photomultiplier tube. Furthermore, Applicants assert that neither Frederick nor Wang overcomes the deficiencies of Kyushima in disclosing Applicants' flush feature.

For at least the reasons discussed above, Applicants respectfully submit that none of the applied references teach, suggest or render obvious the subject matter of independent claims 1, 4 and 10. Accordingly, the applied references also fail to anticipate or suggest the subject matter of the claims that depend from the independent claims. In particular, Applicants assert that none of the applied references disclose or suggest Applicants cutout portion as recited in claim 5. Therefore, Applicants respectfully request that the rejections under 35 U.S.C. §§102(b) and 103(a) be withdrawn.

In view of the foregoing amendments and remarks, Applicants submit that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-10 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number set forth below.

Respectfully submitted,


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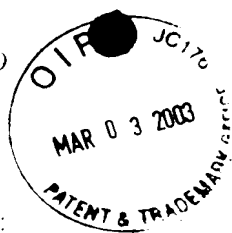
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Attachment:
Appendix

Date: March 3, 2003

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APPENDIX

Changes to Claims:

The following is a marked-up version of the amended claims:

1. (Twice Amended) A method of manufacturing a photomultiplier tube having a faceplate, a photocathode for emitting electrons in response to light incident on the faceplate, an electron multiplying section for multiplying the electrons emitted from the photocathode, an anode for outputting an output signal based on the electrons multiplied by the electron multiplying section, a stem plate for fixedly supporting the electron multiplying section and the anode with stem pins, and a side tube with the stem plate fixed on one open end and the faceplate fixed on the other open end and enclosing the electron multiplying section and the anode, the method comprising the steps of:

providing a metal side tube formed of metal and a stem plate such that at least a portion contacting the metal side tube is formed of metal;

aligning the metal side tube with the stem plate so that an outer edge of the stem plate does not protrude further externally than an outer surface of the stem plate; surface of the metal side tube is flush with an edge surface of the stem plate; and

fusing the metal side tube to the stem plate at a point of contact between the metal side tube and the stem plate by laser welding or electron beam welding to form an airtight vessel.

4. (Twice Amended) A photomultiplier tube comprising:
a faceplate;
a photocathode for emitting electrons in response to light incident on the faceplate;
an electron multiplying section, disposed inside an airtight vessel, for multiplying the electrons emitted from the photocathode; and

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an anode for outputting an output signal based on the electrons multiplied by the electron multiplying section, wherein the airtight vessel comprises:

a stem plate for fixedly supporting the electron multiplying section and the anode with stem pins;

a metal side tube with the stem plate fixed on one open end, and enclosing the electron multiplying section and the anode; and

a faceplate fixed on the other open end of the metal side tube,

wherein the stem plate is welded on the one open end of the metal side tube, a top surface of the stem plate contacting a bottom end of the metal side tube such that an outer surface of the metal side tube is flush with an edge surface of the stem plate, at least a portion of the top surface of the stem plate in contact with the metal side tube being formed of metal.

10. (Twice Amended) A radiation detector comprising:

a scintillator for emitting fluorescent light in response to radiation generated from an object of analysis;

a plurality of photomultiplier tubes, each having a faceplate disposed in opposition to the scintillator, for outputting electric charges based on fluorescent light emitted from the scintillator; and

a position calculating section for performing calculations on the electric charges output from the plurality of photomultiplier tubes and outputting positioning signals of radiation issued in the object of analysis,

wherein each of the plurality of the photomultiplier tubes comprises:

a photocathode for emitting electrons in response to light incident on the faceplate;

an electron multiplying section, disposed inside an airtight vessel, for multiplying the electrons emitted from the photocathode; and

an anode for outputting an output signal based on the electrons multiplied by the electron multiplying section, and wherein

the airtight vessel comprises:

a metal stem plate for fixedly supporting the electron multiplying section and the anode with stem pins;

a metal side tube with the metal stem plate fixed on one open end, and enclosing the electron multiplying section and the anode, wherein the metal stem plate is fixed by welding to the metal side tube such that an outer surface of the metal side tube is flush with an edge surface of the stem plate; outermost edge of the metal stem plate does not protrude outward from an outer surface of the metal side tube; and

the faceplate fixed on the other open end of the metal side tube.